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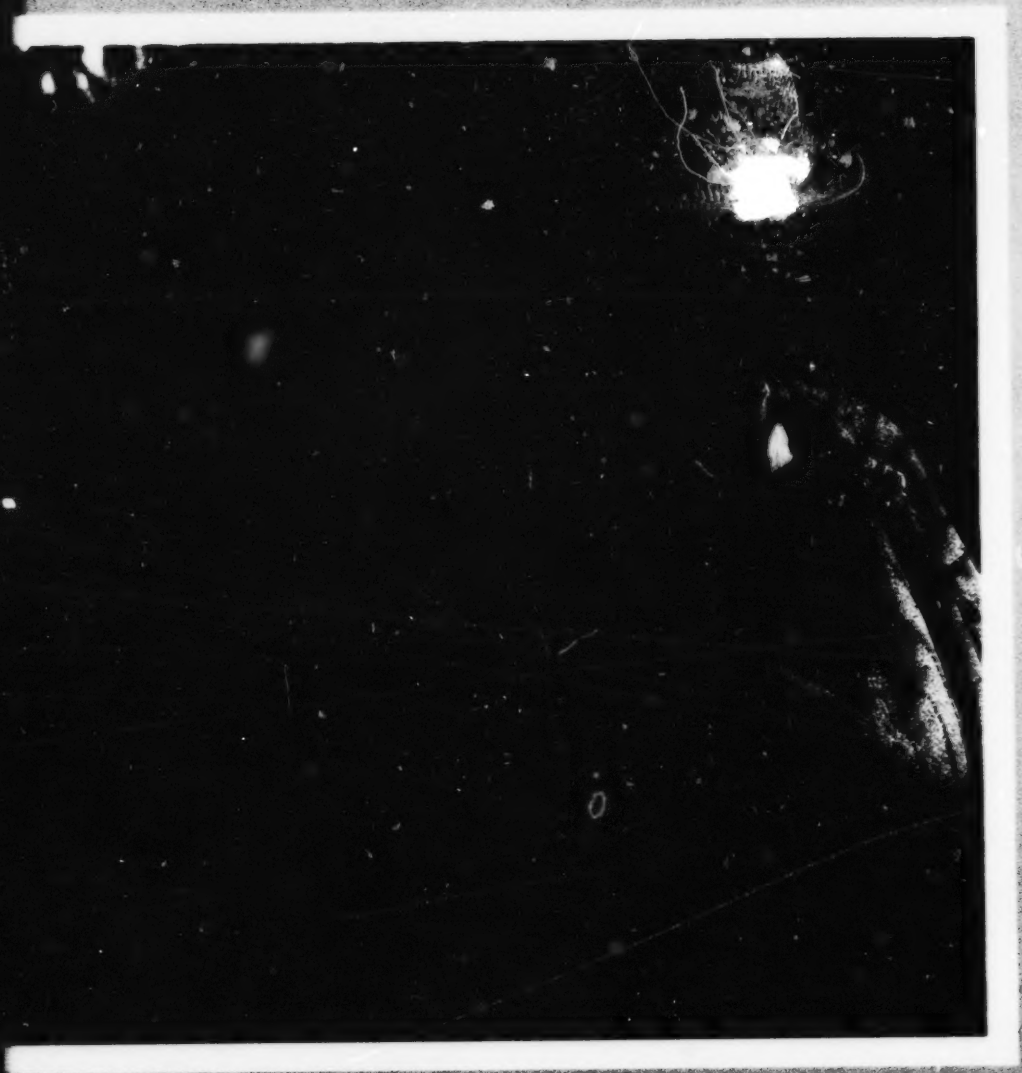

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IDRC 1984 — The Rural Experience

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An element of romanticism is generally present in any account of rural communities: "small towns" in the industrialized countries, "villages" in the developing countries. The undoubted advantages of those places — equitable social structure, a sense of belonging, community involvement — often overshadow in the mind of the observer many of the negative elements equally present.

Particularly today in the developing countries, village life is often nasty, brutish, and short. Increasingly as well, it is culturally arid. Governments, hard pressed to provide the basics of modern life to the inhabitants of cities, find that available resources seldom permit the extension into the countryside of adequate social services such as health care and educational facilities. Fresh, clean water, adequate shelter, waste disposal, food distribution, cooking fuel — these essential ingredients of even a tolerable life — are all too often missing in the villages of many Third World countries.

The result is that millions of people worldwide migrate toward the major cities. Desperate as is life in the violent, overcrowded slums of the metropolitan areas, it is often superior to what these rural people have left behind, and so they continue to come. The city attracts because of its promise of social amenities such as hospitals, schools, some welfare services, and the often ephemeral allure of employment. What the city may deliver, though, is overcrowding, pollution, and a new form of struggle.

IDRC President Ivan L. Head in northern Thailand.

Nevertheless, the flow continues. Monitored by such agencies as the United Nations Fund for Population Activities, the growth of Third World capitals is becoming exponential. In 1980: Mexico City, 15 million; Calcutta, 9.5 million; Cairo, 7.3 million. In some countries, the urban–rural population balance is approaching that of the industrialized north, but with a major difference: those left in the rural areas do not possess the skills and the means to grow food for the rest. Modern, mechanized agricultural practices are little in evidence in developing countries; as a result, shortages of farm labour at harvest time are far from unusual. When cyclical drought visits a region, as in much of sub-Saharan Africa at present, the circumstances combine to produce wide-ranging famine, affecting city and rural dwellers alike.

The Board of Governors of IDRC has always insisted that the primary beneficiaries of the Centre's support for science and technology should be the rural dwellers; new and hardier plant species, agricultural techniques specially adapted for peasant farmers, durable water pumps, better pedagogical methods, the means to combat infant diarrhea, and a host of other responses to the most basic needs of the rural population can and should be the products of modern research methodologies. Consequently, an overwhelming proportion of IDRC funds is dedicated to research in these areas. Research to diminish malnutrition, disease, illiteracy. Research to reduce the migration to the cities. Research to restore human dignity to life in the villages.

Some of those activities are described in the following pages.

Ivan L. Head
President, IDRC

The Politics of Neglect

THE neglect, if not the abuse, of the rural dweller is an historical constant. Heavily taxed, food producers have rarely been allowed to enjoy the fruits of their hard labour. Yet it is their food surpluses that have made towns, cities, and what we have come to call "civilization" possible. It is their values and the remarkable enduring qualities of their villages that have provided our very cultural underpinnings. As Robert Redfield, the anthropologist and humanist has observed, culture first originates in villages and then flows into cities where it becomes systematized. It is also a culture, added Redfield, that possesses "a greater vitality and disposition to change" than city culture. The progress and destiny of humanity may well rest then on two rural resources that meet our most fundamental needs: food to alleviate hunger, and a moral vision to guide us as we stumble through history.

Though they number some 2.4 billion, most of the villagers and peasants of the Third World seem condemned to chronic political marginality. Poor, illiterate, exposed to debilitating diseases, and physically and culturally isolated, rural dwellers toil in solitude and silence while legislators, often oblivious to their plight, sit and debate in distant capitals.

The villagers' landholdings are fragmented. Their tiny, disconnected plots cannot sustain an economically viable farming operation. Cereals are the subsistence diet, at an intake level scarcely above starvation. Cholera and other diarrheal diseases are endemic, and malaria, once believed on the edge of eradication, is making a startling comeback.

IDRC's Mandate

As the Organisation for Economic Co-operation and Development has consistently and correctly pointed out, "Rural development concerns the vast majority of the population of the Third World." In some of the least developed countries of Africa and Asia, the rural component of the total national population exceeds 80 percent. In Ethiopia, it is 93.4 percent; Kenya, 90.8 percent; Nepal, 96 percent; and Indonesia, 83 percent. Even with today's frantic pace of urbanization, the rural reality will not vanish in a jungle of concrete high rises. United Nations estimates indicate that, as the 20th century ends, the urban growth rate will decline in both developed and developing countries, but the rural growth rate will increase from 1.37 percent per annum (1959–1960) to 1.48 percent. This means that by the year 2000 at least another 300 million people will be living in the rural areas of the developing regions.

When the International Development Research Centre was created 14 years ago, the paramountcy of the rural reality was in the minds and hearts of its Board of Governors. At its inaugural meeting in October 1970, the Board expressed the wish that a substantial portion of the Centre's activities focus on improving the well-being of rural dwellers, the last people to benefit from the advances of science and technology. As we will see in the pages that follow, the Centre has respected the wishes of its first governors and placed rural development at the core of its mandate.

One does not wish to paint too dark, too grim a picture of the rural dweller's daily life. Generally, a rural household at the same level of income as an urban household is likely to have a higher standard of living, and will be spared some of the humiliating brutalities inflicted on the millions trapped in city slums. The people who live in the countryside and the world's one million villages can count on a powerful sense of community for support, virtually indissoluble family bonds, and the serenity that comes from living in harmony with one's natural environment. But there are rural poor — and there are many.

About 40 percent of rural people in all developing countries live in absolute poverty. In the lowest-income countries, the proportion is more than 50 percent. There is nothing vague or equivocal about absolute poverty. According to the World Bank, it is: "A condition of life so characterized by malnutrition, illiteracy and disease as to be beneath any reasonable definition of human decency."

Further, states the World Bank concerning these "absolute poor": "As much as four-fifths of their income is consumed as food. The result is a monotonous, limited diet of cereals, yams or cassava — with a few vegetables and in some places a little fish or meat. Many of them are malnourished to the point where their ability to work hard is reduced, the physical and mental development of their

The rural experience: virtually indissoluble family bonds.

children is impaired, and their resistance to infection is low. They are often sick — with tropical diseases, measles and diarrhoea, and cuts and scratches that will not heal. Complications in childbirth are a common cause of death. Of every ten children born to poor parents, two die within a year; another dies before the age of five; only five survive to the age of forty.

The great majority of poor adults are illiterate; their children, though having a much better chance of attending school than in the past, usually do not complete more than a year or two. Unable to read a road sign, let alone a newspaper, their knowledge and understanding is severely limited."

Rural–Urban Disparities

A host of social indicators documents the widespread poverty of rural dwellers in developing countries. In South Asia, only 17 percent of the rural population has access to potable drinking water; the percentage for urban settlements is 66 percent. In Latin America and the Caribbean region, the corresponding figures are 35 and 79 percent respectively. In Brazil, 60 percent of all poor households are rural; in Malaysia, it is 70 percent. In all, more than 1 billion rural dwellers have annual incomes under $100 (US) a year.

There are rural–urban disparities in health and education. In rural Nigeria, there is only one hospital bed for every 18 450 people, whereas in the cities there is one for every 400 people. In Pakistan, the corresponding figures are 12 300 and 560. In Colombia, rural dwellers and those in small towns (64 percent of the total population) have access to only 9 percent of the country's doctors. In Ethiopia, there is one doctor for every 3000 people in the capital city of Addis Ababa, but in the countryside there is only one doctor for 100 000–250 000 inhabitants.

Rural populations must have fresh, clean water.

In Latin America, 66 percent of primary schools in urban areas offer at least the first 5 years of schooling; in the countryside, only 6 percent of schools do so. Rural post-primary education is virtually nonexistent and those few students who continue their education must do so in cities. When they do, they rarely return to their villages to share their new knowledge. They remain in offices and factories, denying the countryside the productive labour resources it needs to meet the increased food demands generated by urbanization.

Many Third World countries have made heavy capital investments in centralized energy facilities designed to meet the needs of urban agglomerations. But most of their population is rural and their particular needs have been ignored. The daily search for fuelwood to prepare meals is destroying the tree cover in dry and alpine regions. It is estimated that close to 1 billion cubic metres of wood are harvested for fuel each year in the tropical zone. The worldwide rate of deforestation is staggering. Thailand has lost 25 percent of its forest cover in only 10 years; Costa Rica has lost 33 percent. Research is desperately needed on rural energy requirements.

The economic stagnation of the countryside, coupled with its sometimes extreme physical and cultural isolation, means that the most able-bodied and the best educated will migrate to cities where they feel they will at least have an opportunity to fulfill their ambitions. This debilitating human erosion condemns already impoverished villages to perpetual social and political marginality, and further stagnates agricultural production. In this scenario, the politics of neglect become rooted in pessimism and despair. Urbanites, better educated and politically organized, will continue to monopolize the attention of officials.

The scope of rural development must be wide for its social, political, and human implications are far reaching. Rural development cannot be limited to, or thought to consist solely of, changes in agricultural technology; it must touch every facet of rural life: education, health, water supplies, craftsmanship, communication, and transportation. To assign priority to rural development is to recognize that hunger cannot be alleviated unless people remain and prosper on the land. And in this truth may also lie our sense of destiny.

The scope of rural development must be wide, touch every facet of life.

Note: Though all the projects described have been officially approved by IDRC, in some cases the final agreement with the recipient may not yet have been signed.

THE quest for survival calls for a mystical bond between human beings and the land; from the mist of antiquity, cultivation has been inextricably linked to worship. In Assyro-Babylonian mythology, Marduk, the oldest son of the great god Ea, personified the fertilizing power of water; he made plants grow and grain ripen. Saturn, an ancient Roman agricultural divinity, celebrated each year with festive abandon, was synonymous with abundance. In old Confucian rites, Shen Nung, one of the great legendary emperors, was the Chinese deity of Medicine, Pharmacy, and Agriculture. His powers were abetted by a host of agricultural deities such as the Celestial Prince Liu, superintendent of the Five Cereals, and the god Hu-shen, who protected the fields against hail.

In countries where agroindustrial enterprises have supplanted subsistence farming, agriculture's link with belief, along with its origins, has been all but forgotten. The earliest forms of cultivation were long thought to have begun in the Near East, about 4000 BC. But more recent carbon and other dating techniques suggest that agriculture originated much earlier and that animal domestication probably preceded cultivation by several thousand years. Man may first have cultivated wheat along the Nile as early as 13 000 BC. Maize and beans were grown in Mexico and Peru by 6000 BC, and rice near Non Nok Tha in Thailand by 4000 BC or even earlier. Around this time, the Chinese were eating millet, gathering a variety of wild plants, raising pigs, and growing cabbage. They had also invented the pottery wheel, domesticated cattle, and made rice their staple crop. On the Central Asian Plateau, man was shaping animal and vegetable life as early as 11 000 BC. Precious cultivars of wild wheat and barley can still be found in this region today. And of singular importance in present rural development strategies is the acknowledgment that agriculture was not invented by Neolithic man, the unsettled, wandering hunter, but by Neolithic woman, the collector.

Progress in chemistry and biology has unraveled many of the mysteries of plant growth and animal life.

Agriculture remains the source of livelihood for more than half the world's

population and a pivotal factor in the progress of nations. The economic advance of developed countries was made possible by the production of large food surpluses that permitted services in education and health, and the development of banking and commerce.

Only about 11 percent of the world's land area is arable. There is no direct relationship between the amount of arable land per capita and level of income. Europe, for instance, has about the same amount of arable land per capita as Asia, and considerably less than Africa. All significant advances in agriculture have been causally related to science and technology. Progress in chemistry and biology has unraveled many of the mysteries of plant growth and animal life. Fertilizers, insecticides, crop rotation, plant and animal breeding, and methods of cultivating and plowing are all largely the result of advances in science and technology. It could be argued that it is essentially the uneven application of science and technology in different countries that is largely responsible for the great agricultural disparities that we now see around the world.

Science and Technology in Agriculture

In the age of "crisis journalism," where the flow of events is newsworthy only when it has reached some zero hour, there is an inherent danger in labeling anything as "critical"; media consumers can grow terribly weary of crises. But in the case of agriculture and food production in Africa, there is no better label. There are many reasons why Africa's situation is so desperate, a major one being a worsening of the continent's endemic drought. As it spreads from the eight Sahelian nations to 24 countries in all, this seemingly irreversible desiccation casts a terrible pall of despair over the continent. In 1973 alone, 100 000 people died as a result of this climatic terror. But with better neonatal care and the widespread use of antibiotics in the last 15 years, many African nations have nonetheless seen their population increase by as much as 50 percent. The continent's overall population growth rate exceeds 3 percent a year; the annual rise in food production — before the drought worsened — was only 1.3 percent. The 1984 food deficit of 5 million tons is twice what it was a decade ago. If anyone is weary of crises, it is the hungry people of Africa.

Given the catalytic role of scientific progress in agricultural development, it is clear that the priority in Africa is to apply science and technology to the continent's unique soil, climatic, economic, and other essential characteristics. Since 1970, IDRC's Agriculture, Food and Nutrition Sciences Division (AFNS) has funded some 240 projects in Africa and the Middle East. In the past few years, there has been added emphasis on farming systems research, an approach that incorporates all the dynamics of a small farmer's operations, and ensuring that improved technologies are adapted through national agricultural programs.

Farming Systems

The AFNS Division has provided significant funding support for farming systems research projects in Mali, Cameroon, and Ethiopia. Another such project has now been funded in Sierra Leone, a country whose population of 3.5 million is rapidly increasing at a rate of 2.6 percent a year. Rice, the major staple food crop, is grown principally by the traditional slash-and-burn method. Demographic and economic pressures, however, have left cultivators no choice but to reduce the fallow period of 8–12 years to as little as 4 years. In the rain

forest conditions of Sierra Leone and many other parts of West Africa, such a drastic reduction in the fallow period could easily result in a serious and permanent loss of soil fertility. IDRC has helped fund a pilot farming systems research unit in the Ministry of Agriculture designed to benefit small farmers and their families. Sierra Leone, a member of the recently formed West Africa Farming Systems Research Network (WAFSRN), will share research findings with other member countries.

The reality of small-scale farming must guide innovations in technology.

The Centre's support of farming systems research extends to all developing regions. In Bhutan, a small landlocked country in the eastern Himalayas where 90 percent of the 1.2 million inhabitants depend on agriculture for their livelihood, low yields, particularly of rice, and the lack of research and trained professional staff are resulting in ever-larger deficits of food grains. Through the International Rice Research Institute (IRRI), the Centre is providing major funding support to help Bhutan develop appropriate technologies to increase productivity in rice-growing areas.

Underlying the Centre's focus on systems research is the principle that to understand the farm operation it must always be seen holistically. The world's most common farm is the mixed farm, as found in the humid and semi-arid tropics. In Asia, for instance, livestock contribute 20–40 percent of farm income. However, there is no research methodology to take advantage of new pastures and crop varieties, new rotations, and agricultural by-products to feed animals and improve the efficacy of these farms. The Division is now funding a new phase of research in the Asian Farming Systems Network, an organization that arose out of earlier multiple-cropping projects at IRRI funded by the Centre and other donors. Continued funding will help 12 countries, with more than 200 research sites in Asia, to use new methodologies and improve the productivity of crops and livestock. The Division recently fused its crops and cropping systems program with its animal sciences program.

Agricultural production on the Caribbean island of Jamaica typifies the situation faced by Third World farmers. Eighty-two percent of the farms on Jamaica are under 2 hectares in area; fully 90 percent of food-crop production is by small-scale farmers. And though 50 percent of the island's population is involved in agriculture, their labour generates mar-

ginal revenues, accounting for only 8 percent of the gross domestic product (GDP).

Most of the research on technology for small-scale farmers is on-station research and is largely unrelated to the reality of farmers' holdings. IDRC is providing funding support to the Jamaican Ministry of Agriculture and the Jamaica office of the Interamerican Institute for Cooperation on Agriculture (IICA), a branch of the Organization of American States (OAS), to undertake a farming systems research program in two major ecological zones. Researchers will try to identify improved production methods for the major cropping systems, and train project staff and associated personnel in on-farm research techniques.

Network Support

IDRC's special effort to encourage a more precise application of improved farming systems can take the form of support to the regional and international agricultural research centres whose activities are linked to national research programs. In the past year, for instance, AFNS has provided substantial support to the International Institute of Tropical Agriculture (IITA) in Ibadan, Nigeria, to allow the latter to help members establish national farming systems research programs in their own countries.

Another example of IDRC's active and continuing network support is in the area of oilseeds research. Of great dietary importance, but often in very short supply in rural areas, oilseeds have received only fragmented research attention in spite of being a key crop for subsistence farmers. A few years ago, therefore, IDRC established an oilseeds network based in Ethiopia to link its projects in Eastern Africa, Sri Lanka, and the Indian subcontinent. The result was effective, practical liaison, as well as assistance in conducting new oilseeds research in Ethiopia. Oilseeds supply the essential fatty acids in the diet of most Ethiopians and the cake that remains after oil extraction is a valuable livestock feed. Improved technologies could lead to the use of the residue as a source of protein in human diets. With continued funding, the network's adviser will pursue his work in the Ethiopian highland and lowland oilcrop projects, arrange for exchange visits by scientists to different projects in different countries, and compile an annual newsletter for project scientists. This is an important form of support to Third World scientists, who often feel isolated, that they lack the right kind of research experience, and that no one is interested in their work. If agriculture in Africa and Asia is to benefit from a solid research base, young scientists must not abandon their work.

In Latin America, an important example of IDRC network support is continued funding of the Tropical Pastures Network established in 1979 by the Centro Internacional de Agricultura Tropical (CIAT). Earlier IDRC support made it possible for the network to develop a methodology to evaluate tropical pastures on small parcels of land. With beef representing 10–24 percent of total food expenditures, and milk an additional 7–15 percent, pastures are important in Latin America. However, acidic, infertile soils constitute 40–50 percent of total land resources and the poor quality and quantity of forage have a marked negative effect on livestock production. Continued funding will enable further development of livestock production systems through the introduction of improved species of grass and legume pastures and will strengthen national research capabilities in pasture research.

Practical Research

An example of the Centre's support for appropriate and significant technological change is grain dehulling and milling systems. Since 1970, the Centre has been actively involved in perfecting a dehuller originally developed by the Prairie Regional Laboratory (PRL) of the National Research Council of Canada. The PRL dehuller can remove the seed coats of tropical cereal grains (millet, sorghum, and maize) as well as tropical grain legumes (cowpeas, pigeon peas, and soybeans). But the basic dehuller is too large for most villages and the Centre is now funding a project to improve and field test a mini-dehuller for village use, and set up the manufacturing capacity to mass produce it for use within Senegal and for export to other West African countries. The dehuller may greatly help present-day Africans reacquire a taste for their native cereals and have an important impact on the continent's overall food situation.

Food Storage

Increasing crop yields does not necessarily lead to higher farm incomes and living standards; prices paid to farmers are low and the costs for storage are high. Nor is agricultural production determined by growth rates alone. What happens to food once it is grown is also important. In Sierra Leone and in many other parts of Africa, inadequate storage sometimes accounts for large losses to rice crops. Earlier IDRC research support established that, though the moisture content of stored rice was maintained at an acceptable level, insect and microorganism infestations had a pejorative effect on seed quality. Continued funding will make it possible to field test improved storage containers of mud and straw to reduce postharvest losses of the country's vital rice crop.

The Centre has been providing funding support for postproduction systems in eight Andean communities of Peru since 1979. These communities represent a fascinating ecological and socioeconomic cross section of the approximately 2800 traditional Indian farm communities in the Peruvian Sierra. Some of the crops, such as quinoa, oca, tarwi, and kiwicha, date back to the very beginnings of Inca agriculture. This research, which has always stressed community involvement in documenting farming activities, has made it clear to everyone that it is necessary to develop appropriate postharvest technologies. Continued funding will allow the Peru office of IICA to develop improved techniques and systems for harvesting, preserving, and processing native grains and tubers.

Cooperative Research

The Cooperative Programs Division supports projects that promote collaboration between research groups in developing countries and their counterparts in Canada. Part of its mandate is to explore new fields of research for IDRC, for example, the earth sciences and technology for local enterprises. When a project falls within an already established area of IDRC expertise, the funds may be administered by other program divisions. One such project links Guelph University, one of Canada's foremost centres of agricultural expertise,and Chile's largest private university, Pontificia Universidad Católica, to determine the biological changes occurring during storage that contribute to the hardness of common beans (*Phaseolus vulgaris*). Each year, developing countries produce about 5 million tonnes of beans, legumes rich in vital amino acids, and important supplements in cereal diets. The problem with

hard beans is that they require so much fuel for cooking. This project will develop simple and inexpensive roasting methods to arrest hardening of beans, and so improve keeping quality and reduce cooking times. The results could be important savings in energy for the world's poor, the largest consumers of this important, low-cost source of protein. IDRC has funded considerable research on legume quality in several countries — faba beans in Egypt, lentils in Lebanon, and common beans in Guatemala.

Cooperation: sharing knowledge in a world of interdependence.

Sharing Knowledge

Poor agricultural productivity is a multifaceted problem and must be addressed from several perspectives. The work of one division must be complemented by project support from other divisions. The Information Sciences Division's funding support to the Société nationale pour le développement rural (SONADER) in Mauritania will mean that valuable information on agriculture will be collected, stored, and disseminated for the benefit of the country's researchers. Some 90 percent of the people of Mauritania live in rural areas, and the government has given agriculture absolute priority with the goal of reaching food self-sufficiency by the end of the century. The project links SONADER's Documentation Centre to AGRIS, the global information system for the agricultural sciences and technology, operated by the Food and Agriculture Organization (FAO) of the United Nations. Several other countries, Bangladesh, Egypt, and Senegal, for instance, have received similar support to enable and encourage their participation in AGRIS.

In Asia, where tremendous progress in agriculture has taken place as a result of cropping systems research, the introduction of high-yield varieties, and the better use and greater availability of fertilizers, the priority is information analysis. The Asian Vegetable Research and Development Centre (AVRDC) is an international institution funded by several governments and donor agencies to conduct research into vegetable legumes for the benefit of all the countries in the lowland humid tropics. Support from the Information Sciences Division will enable AVRDC to strengthen and expand its specialized information analysis on three important vegetable crops in Asia: Chinese cabbage, mung bean, and soybean. Vegetables, especially vegetable legumes, are very important sources of protein, vitamins, and minerals in populations where the major dietary component is low-protein starchy foods.

Support from the Communications Division to enhance indigenous scientific publishing competence further complements the research endeavors supported by other divisions. One such project, based at the International Rice Research Institute (IRRI), will provide editors from national research centres with training in the skills essential to writing, editing, and producing and disseminating publications reporting on research findings. Improving the clarity and quality of the material published, and ensuring it is effectively disseminated, helps the research initiatives of national programs to receive due attention and recognition, both at home and within the global scientific community.

Forests For Food and Fuel

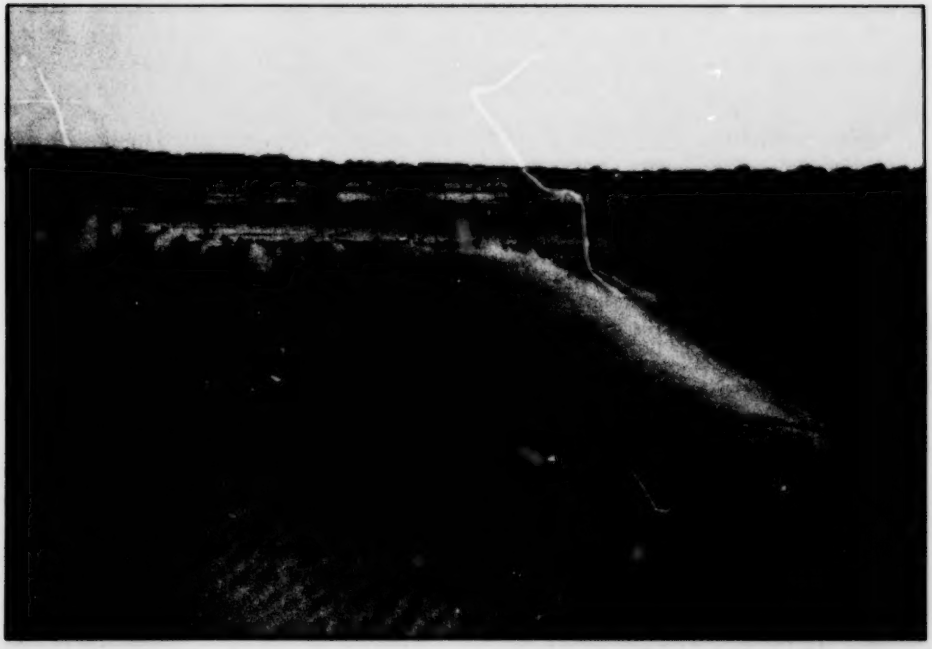
Ten years ago, the industrialized world was first alerted to an energy crisis far graver than rising prices and shortages of fossil fuels. The vanishing supply of wood energy for domestic use — mainly for cooking — may well be the single most important environmental issue facing developing countries. IDRC's forestry program, a subprogram of AFNS, has now supported more than 50 projects, 40 of which are still active. Given the nature of the problem, that is, that wood supplies cannot be repienished quickly and research needs long-term funding, most of the forestry projects usually go through several phases and receive sustained support.

One such project is in Malawi. Ninety percent of the country's 6 million people live in arid and semi-arid areas and indigenous forests are being rapidly depleted as a result of agricultural expansion and increasing wood-energy demands. Here, IDRC has supported one of its most successful forestry projects. In less than 3 years, some 93 species trials have been conducted and valuable knowledge gained on planting techniques and the management of small-scale plantations on communal village lands and private farmlands. Small-scale landholders and villagers have become interested in tree planting and have enthusiastically participated in the

project. Exciting progress has been made toward providing rural dwellers with an adequate and continuous supply of wood for cooking, heating, construction, and shade. In the second phase, project officials will continue to work closely with the rural population by developing an active small-farm agroforestry program.

A new project, in Zambia, will be integrated into the network of IDRC-supported afforestation projects in this region. In Lusaka, the capital, the price of a bag of charcoal has increased fivefold in a year. In less than 2 years, the woodlands surrounding the city may vanish. The government is committed to solving the country's wood-energy problems but simply does not have the research data necessary to create fuelwood plantations. The project will identify fast-growing tree species and develop improved management practices suitable to plantations. Many villages and small-scale landholders will, therefore, have a valuable cash crop, and the rural poor in the areas most affected by the region's chronic drought will have wood for cooking at a price they can afford.

Deforestation has taken its toll elsewhere in the world. In the arid and desertic areas of South America, national woodlands are terribly depleted. In some places they have been completely destroyed to meet local demands for fuelwood, fodder, and basic construction material. But large irrigation schemes developed in river valleys along the coast, and several sites adjacent to the irrigated lands not suitable for agricultural production, offer excellent opportunities for planting multipurpose trees. In Peru, earlier IDRC-sponsored afforestation pro-



Desertification: climate and population pressure take their toll in a fragile ecosystem.

jects concentrated on establishing tree plantations in the highlands and led to a separate project in the coastal lowlands. In this region, where half of the country's population lives, reliable low-cost techniques for establishing forest plantations will be developed. Particularly interesting will be a study of the feasibility of precipitating fog drip to irrigate the plantations in the southern coastal foothills. Trees could act as natural interceptors for the heavy low clouds that gather during the three or four winter months. Precipitation could reach 2 millimetres an hour.

Throughout Southeast Asia, the Information Sciences Division has supported a cluster of projects to help safeguard the welfare of rural populations earning their living from mangroves, fragile ecosystems consisting of evergreen swamp forests. In Indonesia, where nearly three-quarters of all the mangroves in the region are found, this source of livelihood for a very large part of the coastal population has almost been eradicated. With support from the Division, scientists at Gadjah Mada University in Yogyakarta will develop their country's capacity to carry out research into mangroves using data collected from remote sensing. This advanced technology, utilized previously in Thailand with IDRC support, will allow Indonesia to determine rapidly the exact nature and extent of the threat faced by this valuable ecosystem.

One country that has taken bold steps to meet domestic rural energy needs and stop the destruction of its wood reserves is the Philippines. A national electrification program based on 75 wood-burning plants of 3-megawatt capacity each is being implemented to meet about 20 percent of rural electricity needs by 1987. A project funded by the Centre's Special Program Activities (initiatives that do not fall within the jurisdiction of major program divisions), and administered by AFNS, will use existing technology to develop a small-scale energy system of 20–50 kilowatt capacity to provide electric power to remote communities that cannot be connected economically to the planned rural electric grids. Based on locally available renew-

Village woodlots: exciting progress in providing rural dwellers with multipurpose trees.

able resources — for example, large plantations of fast-growing leguminous tree species such as Leucaena — the research will benefit the rural poor by providing a cheap source of power, and increasing revenues and employment.

The energy policy subprogram of the Centre's Social Sciences Division administers a number of projects concerned primarily with energy policy research. One project, in Brazil, will develop an original methodology for a complete evaluation of rural energy needs. Such a methodology is essential in many countries to complement centralized energy planning that cannot take into account regional and local peculiarities, particularly those concerning land use and availability.

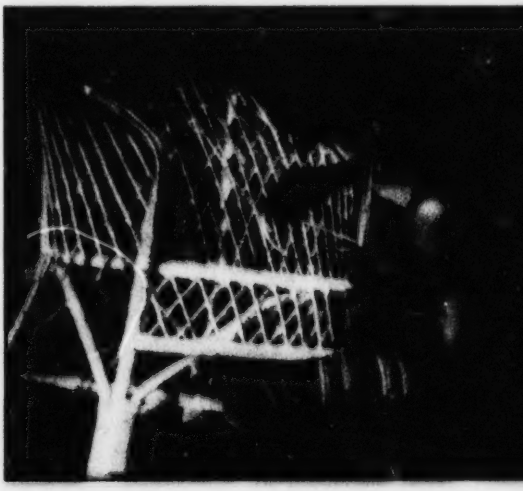
The Centre also supports energy research through the Energy Research Group, an independent body of 10 eminent developing-country energy analysts and policymakers, co-funded by IDRC and the United Nations University, Tokyo. In the past year, the Group participated in a meeting at the Centre attended by major energy research donors, who reviewed the scope and range of energy research, particularly as applied to rural, small-scale use.

Bamboo and Rattan

A cluster of projects on bamboo and rattan, supported by the forestry program of AFNS, is closely related to important rural needs, from low-cost construction materials to food, farm tools, and a wide range of woodenware. In Bangladesh, for instance, where bamboo is the main construction material for 90 percent of rural housing, it has become scarce and expensive. Funding support will continue for research on high-yield, high-quality bamboo in villages and state forests. A second phase will include a training component to help rural people propagate and manage bamboo groves in selected villages.

On Java, the most populous of the Indonesian islands, and where bamboo is as much a part of the rural reality as rice, research will continue on ways to preserve bamboo from borer attack once it is felled. Another project there will identify improved methods to produce, collect, and use rattan. Indonesia produces and exports over 80 percent of the world's supply of raw rattan. This is a labour-intensive industry; entire villages depend on it. But the country's 9 million hectares of national rattan forests and communal plantations are being depleted by land development and overexploitation. This research will benefit neighbouring countries in Southeast Asia who must also arrest the depletion of their bamboo and rattan resources.

One such country is Sri Lanka. Bamboo and rattan have been used here for centuries for housebuilding and handicrafts, but demand now exceeds supply and a valuable source of revenue is unavailable for the rural economy. A project will train local staff to undertake research on both indigenous and exotic species by establishing pilot plantations.



Rattan is essential in cottage industries.

Fish: one of the few affordable sources of protein in many countries.

The results should help reduce the country's imports of rattan and assure the economic viability of cottage industries.

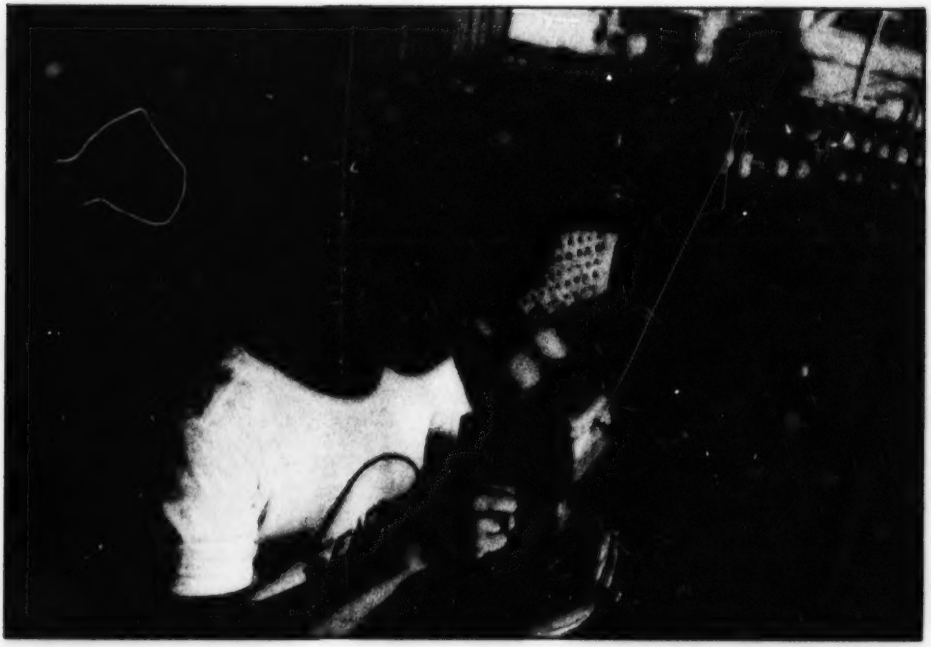
In Malaysia, too, rattan is a major source of rural employment, providing jobs for more than 50 000 aborigines, and the raw material for an important cottage industry and export trade. But supplies from natural forests are diminishing and it has been difficult to establish plantations because of the lack of good-quality seeds. A project at the Forest Research Institute (FRI) will develop tissue-culture techniques to produce high-yield, disease-free plantlets for the mass propagation of commercial rattan. In Malaysia, a few years ago, the Information Sciences Division funded the creation of a regional information service on rattan at FRI. The Centre has now made much progress on storing and disseminating valuable research literature on rattan, a subject previously largely ignored in spite of its economic importance for millions of rural dwellers.

IDRC's sustained, multi-sectoral project involvement in bamboo–rattan research is a good example of focused funding support to foster the application of science and technology for development.

Fisheries — Balancing the Food Equation

In many developing countries, fish is one of the few affordable sources of protein. But serious obstacles must be overcome before adequate supplies can be made available. Aquaculture is plagued by disease epidemics and the industry has little or no access to scientific literature, and much fishing, particularly in Africa and Latin America, is artisanal and the catch falls far short of demand.

The intensive research support in aquaculture provided by the Centre's fisheries program over the past 10 years has generated important research results. A project in the Philippines led to the



IDRC's Information Sciences Division supports projects to increase the information capability of fisheries institutions.

first-ever successful breeding of milkfish in captivity and has had implications for the whole of Southeast Asia, where the milkfish is enormously popular for its taste and high nutritional value.

Before national governments can commit large investments to aquaculture, however, much more must be known about major fish diseases and parasites. Increased stocking densities mean increased exposure of fish to health hazards, vast areas of successful aquaculture ponds could be quickly wiped out. A major project in the Philippines will identify pathogens and their epidemiology, establish a central fish-disease laboratory, and train core staff in research procedures. The work, to be conducted by the Philippines Bureau of Fisheries and Aquatic Resources, will greatly strengthen the IDRC-supported project network on fish disease in the region.

The fisheries sector of most coastal countries in Latin America is underdeveloped. Colombia, for instance, in spite of its extensive coasts on the Pacific Ocean and Caribbean Sea, must import more than $65 million (US) of fish products each year. With support from IDRC, COLCIENCIAS, an agency created in 1968 under the Ministry of Education, will update its array of information on fisheries resources to prepare a pilot development plan for the country's small-scale fisheries. The agency will also devise a practical model of fisheries development for small communities along the country's extensive coastlines.

The Centre's Social Sciences Division actively supports research into the development of artisanal fisheries. In Senegal, a country that faces worsening food shortfalls because of the unrelenting drought and rural–urban migration that depletes the agricultural work force, the Division has funded a project in the Casamance region in the southern portion of the country. Here, as rainfall has

decreased, the salinity of the water in the fish-rich marshland has risen and now threatens a vital food source. The project will explore the relationship between fishing and agriculture in Casamance, the ways in which local people manage fish and farm resources, and how conflicting demands for limited fisheries resources by different ethnic groups can be reconciled.

In Chile, a project is looking at several small coastal fishing communities. Researchers are examining fishermen's organizations, as well as ways to improve fishing technology and access to credit facilities. Chile's fisheries sector directly employs from 30 000–40 000 artisanal fishermen. But low-level technologies in both capture and processing, unstable income, and lack of credit and marketing infrastructures prevent the country's extensive marine resources from being exploited to their full potential.

In Paraguay, the Division has funded a project to study the development of the country's fisheries over the past decade. In sharp contrast to other sectors of the economy, fishing has experienced dramatic growth in the past 10 years. However, in most cases, current catches are significantly below estimated potentials and the country is not able to meet international demand for its fish products. Future policy positions will require in-depth knowledge of the sector to assure continued growth. The results will be of interest to other Latin American nations that wish to develop their fishing industry.

IDRC's Information Sciences Division is supporting a number of projects designed to greatly increase the information capability of fisheries institutions in developing countries. One project will allow the International Centre for Living Aquatic Resources Management (ICLARM), located in the Philippines, to provide fisheries scientists throughout Southeast Asia and the Pacific with access to data bases from outside the region. Another will enable the Southeast Asian Fisheries Development Center (SEAFDEC) to create a specialized information analysis centre on brackish water species (BRAIS). Another SEAFDEC project will create the Southeast Asian Fisheries Information System (SEAFIS) to enable the region to participate in the global fisheries information network coordinated by FAO. This concerted and highly

Small-scale farmers need the protection offered by community organizations.

focused funding support by the Division in Southeast Asia is a major step in its program of fisheries information. It is expected that similar coordinated support will be undertaken in other developing regions.

Change Through Action

Providing a framework for effective social action to better the lives of rural dwellers can be done through cooperatives and similar organizations. Even the harshest critics of cooperatives admit that they do afford small-scale farmers and peasants a measure of protection against exploitation. Projects funded by the Social Sciences Division have looked at the role of peasant community organizations in Colombia, Ecuador, and Peru. But it is also necessary to understand how the interests of large landholders and farmers can influence national policymakers and so impact on the less advantaged sector of rural society. One project will look at the structure of organizations that represent large agricultural producers in Brazil and Chile. The knowledge yielded will help peasant organizations and church and other groups concerned with promoting the welfare of the rural poor.

Another key agent for social change is agrarian law. The Social Sciences Division has funded a project in Indonesia to look at the possible role of agrarian law in fostering agricultural and rural development and in protecting the rural poor and the landless. Researchers at the law faculty of Hasanuddin University are looking at the production-sharing agreements between landowners and tenant tillers in rice-growing areas in South Sulawesi and traditional laws and their implications for national rural development policies.

THERE is a human dimension to the rural experience that is as powerful as the rural dweller's mystical relationship to the land. The bond that unites families and communities in an ethic of mutual help is rooted in the reality that one cannot survive alone. This is seen in the ancient customs and rituals that punctuate work and play and help to create a virtually indissoluble communality. It has been observed, for instance, that villagers who move to large cities will cluster in clearly demarcated areas and for years retain a fierce loyalty to their villages and to each other.

Cultivation, of course, is a group responsibility, not an individual one; many hands are needed to sow, weed, and reap. The nuclear family is rare in rural life; it is better to live in extended families, sometimes including several generations. In such arrangements, the child is a source of pride and joy; in a few years, a pair of strong hands in the fields and security for parents in their old age. Security through children may, though, be related to one of the major problems in developing countries — the high rate of population growth. But population growth is far from being a simple or unidimensional phenomenon, and the causal direction in its relationship with poverty is not at all clear.

In developing countries, some 5 – 10 million children under the age of five die each year from diarrhea.

Protecting Life

Clearly, one way to reduce the need for many births is to reduce infant and child mortality. The maternal and child health program of the Health Sciences Division is concerned with one of the services that the industrial world more or less takes for granted — the provision of adequate health care to mothers and children.

In developing countries, the most common health problems of children are due to communicable diseases, especially diarrheal and respiratory diseases. It is estimated that in Africa, Asia, and Latin America some 750 million children under the age of five suffer from diarrhea each year. Some 5–10 million die from it. The major factors implicated in diarrheal diseases are malnutrition, poor hygienic facilities and practices related to water supply and sanitation, and the presence of pathogenic organisms. In Kenya, as in many other developing countries, studies on diarrhea have been hospital-based and have not evaluated rural control programs. IDRC has provided funding support to Kenya's Medical Research Institute to extend diarrheal research into a rural community and evaluate different community-based control strategies. The result may be a significant step in advancing knowledge about one of the developing world's most serious public health problems.

In Honduras, researchers working on a similar project will investigate the epidemiology of diarrhea in a rural area and provide important information for planning appropriate intervention and control programs. It is believed that 25 percent of all childhood and infant deaths in Honduras are related to diarrheal disease, and the problem is particularly acute in the rural areas where 70 percent of the country's people live. The data will be relevant for other countries in Central America.

Earlier support provided by the Information Sciences Division enabled the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) to establish an International Diarrhoeal Disease Information Service and Documentation Centre (DISC). The ICDDR,B is now the preeminent institution in the developing world on diarrheal research. The Dhaka-based Centre plans to establish outstations in Africa and Latin America to expand considerably the geographical reach of its information activities.

Another cluster of IDRC projects concerned with maternal and child health focuses on the now well-documented benefits of breastfeeding. In countries where the supply of safe drinking water is limited and adequate nutrition uncertain, breastfeeding takes on tremendous significance. A project in the Philippines will promote breastfeeding among rural women in low-income groups with a view to developing a model that can be adopted by the Ministry of Health for widespread use. In the Dominican Republic, researchers will undertake a similar project and design an education program that can be applied throughout the country. In Thailand, researchers will investigate the effects of different breastfeeding patterns and the timing and nature of supplementary feeding on infant growth.

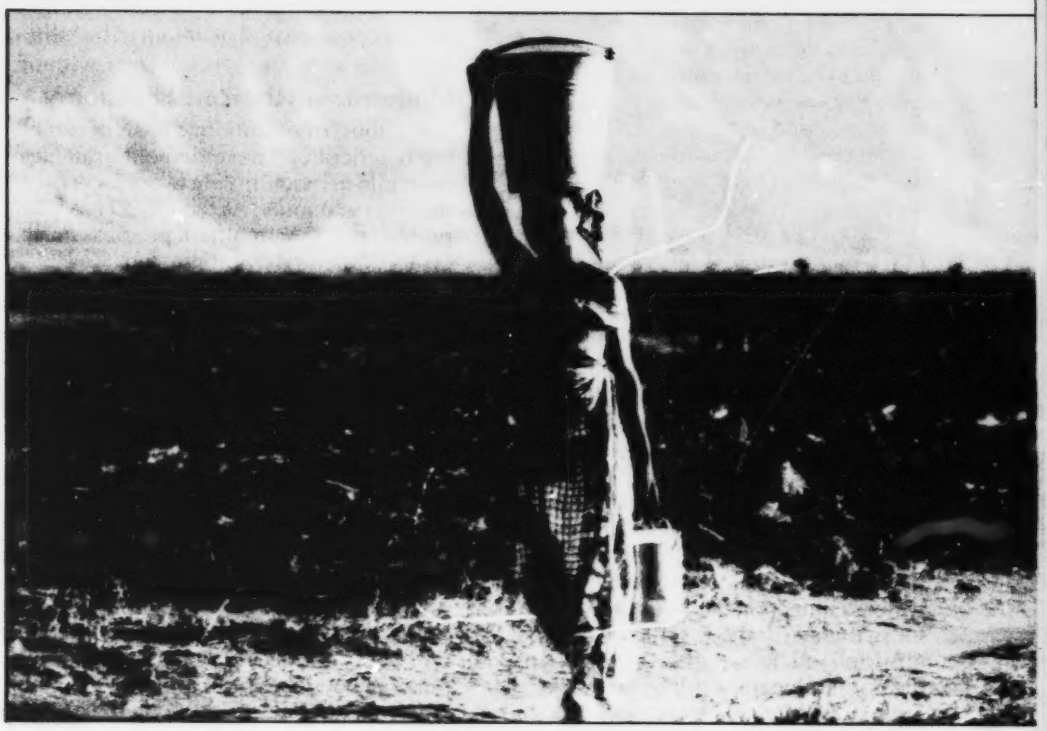
The Health Sciences Division, as are other divisions of IDRC, is concerned with the utilization and application of research results on a regional and even an international scale. In Colombia, the

Rural Health Development Program conducted by the multidisciplinary Research Centre for Rural Development (CIMDER), an organization that arose out of a project supported earlier by the Division, has had a major impact on primary health care programs in rural areas throughout the country. The program has now begun to have measurable influence on the delivery of primary health care in other countries in Latin America, especially in Bolivia and Ecuador where some of its key components have been replicated. Continued funding will enable CIMDER to strengthen its regional research centre and continue developing and testing its rural health model. It should also give it the international credibility and visibility necessary to ensure multiple funding sources for future activities.

Safe Drinking Water

By 1990, some 1.8 billion people in developing countries (excluding China) will require new, clean water supplies. Almost 1.4 billion — 78 percent — will be living in rural areas. It has been estimated that 20 million or more handpumps will be needed by the year 2000. As many as 2.5 million replacement pumps will also be required.

Since 1976, IDRC has been supporting research on the design of a simple, low-cost, shallow-well PVC pump. The piston and foot valve assembly were designed to be interchangeable to save



Water: by 1990, almost 1.4 billion people in rural areas will require new, clean water supplies.

labour costs in their manufacture, simplify maintenance, and keep the required number of parts to a minimum.

Later, IDRC supported research groups in several African and Asian countries to field test the pump. Trials were undertaken in Ethiopia, Malawi, Malaysia, the Philippines, Sri Lanka, and Thailand. The design was then modified according to the availability of local materials.

The second round of IDRC-supported research includes projects in all of the above countries except Malawi. In Ethiopia, where it is estimated that only 4 percent of the rural population has access to adequate and safe water supplies, more than 100 handpumps will be manufactured and field tested. And, of particular significance for developing countries where women are usually responsible for the supply and use of water, village women will be trained to service and maintain the pumps. The project in Sri Lanka will have a similar component. The Sarvodaya Shramadana Movement, a national nongovernmental organization that promotes community organization and self-reliance, and has already been involved in field testing the PVC pump, will train women to manufacture and maintain the handpump in villages throughout the country.

Handpumps alone will not ensure a supply of safe drinking water everywhere. New technologies designed to meet specific geographical and other conditions must also be developed. One priority, for instance, is simple and low-cost water disinfection methods, particularly for scattered rural populations. In northern Thailand, where over 90 percent of the population must drink water from polluted sources, a project will look at solar irradiation as an inexpensive means of disinfecting drinking water and will establish design criteria for a device that can be operated and maintained by villagers.

Modernizing the Rural Economy

Though the economic basis of rural life is agriculture, development strategies must aim at modernizing every facet of the rural economy. As the OECD has pointed out: "Agricultural progress must be accompanied by progress in craftsmanship, by steps towards industrialization within the context of the rural world, and by establishing related activities, e.g., by setting up repair workshops, in order to provide employment and increase rural incomes."

In both rural and urban areas, handicrafts employ millions of people. In India, for example, at least 8 million people are directly involved in handicraft production. These industries earn large quantities of foreign exchange through overseas exports and domestic sales to tourists. Thailand exports over $300 million (US) to overseas markets, the Philippines sells at least $150 million (US), and India's handicraft exports total over $1.35 billion (US), or 20 percent of its total foreign trade.

Crafts-making is often undertaken by people with little or no land who must seek work outside of agriculture. The industries employ large numbers of women and tribespeople, groups that are usually the most difficult for development agencies to reach. Policymakers are more aware than ever of the benefits of a vigorous crafts sector. However, constraints on the growth of these industries need to be identified and removed through appropriate policy measures.

During 1984–1985, IDRC's Social Sciences Division is funding crafts research in Indonesia, Malaysia, Nepal, the Philippines, Sri Lanka, and Thailand. Research teams will link up with others to expand this network still further in Asia and, at some future stage, to involve countries in Africa and Latin America.

The Asian network represents the most comprehensive research program on crafts ever undertaken anywhere. Results will be disseminated through reports published within the participating countries and through national policy dissemination workshops. An international workshop is planned for late 1985 to which policymakers, researchers, and international agencies active in the field will be invited.

Crafts-making is often undertaken by people with little or no land who must work outside of agriculture.

Rural–Urban Migration

The issue of rural–urban migration is tremendously important in developing countries. They are being increasingly deprived of the human resources they must have to build a strong agricultural economic base to reduce food deficits, and at the same time they must cope with the problems generated by the very rapid growth of their cities. Throughout sub-Saharan Africa, cities have been growing at a frantic pace. In Zambia, for instance, the proportion of people living in urban areas more than doubled from 20.5 percent, in 1963, to 43 percent in 1980. Over the same period, the urban population in Chipata District in the Eastern Province more than tripled. Funding support from IDRC will enable Zambia's National Commission for Development to study the dynamics of rural–urban migration in Chipata. The results will help formulate guidelines for similar studies elsewhere in Zambia.

An issue of considerable interest to development specialists, and certainly to the families of migrants, is the effect of remittances from international and national labour migrants. It is generally agreed that remittances from urban to

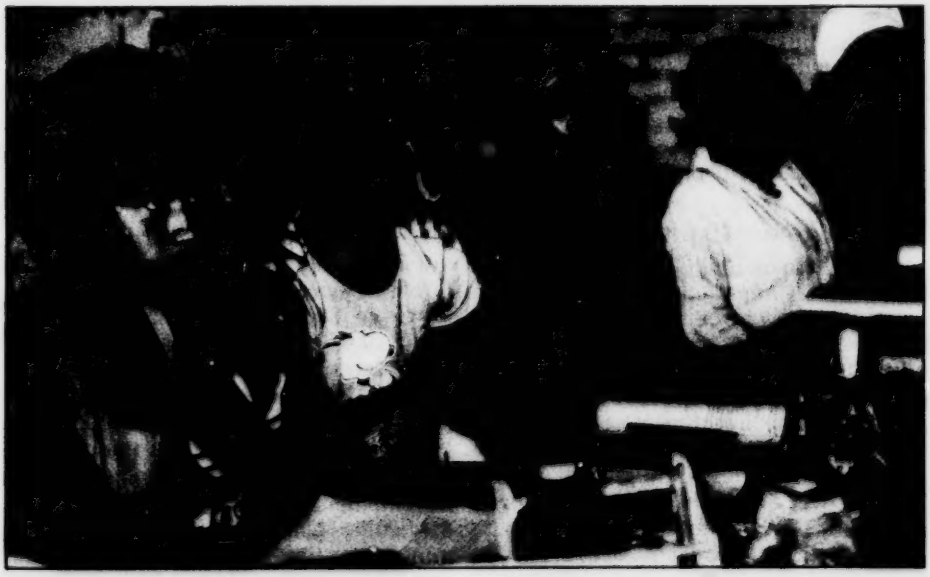
rural areas can be effectively used for education, investment in small businesses, housing, agricultural development, and for the provision of other social services such as water supply and health centres.

In Kenya, where rural development is a crucial priority but severe constraints in public sector spending have curtailed the state's efforts to improve rural living standards, locally initiated community welfare organizations (CWOs) have emerged. They draw heavily on remittances from migrants to urban areas to provide farm credit and improve the overall agricultural picture.

The first phase of an IDRC-supported project documented the importance of remittances in checking deteriorating economic conditions in Kenya. In the case of the poorest rural households, remittances accounted for over 90 percent of total household income. In a second phase, the project will describe the nature and level of community-level remittances and assess the impact of CWOs on rural development at the community and household levels.

Studying Success

It is important that rural development successes be studied closely to guide efforts elsewhere.India is a case in point. Its rural development experience is one of the richest and most varied in Asia. It was one of the first developing countries to address development problems directly and emphasize technological breakthroughs to increase agricultural productivity. With some 21 agricultural universities, 30 agricultural research institutions, and vastly increased levels of food



Rural development: participation of people affected by programs is necessary.

production and stockpiling, India has achieved something of an agricultural miracle. A project supported by the Social Sciences Division will enable six distinguished Indian academics and promising young scholars to examine rural development experiences in India. They will assess the effectiveness of different approaches and policies, and their relevance for present rural strategies in India and other Asian countries.

Participating in Development

Rural development can only work if rural dwellers participate actively in planning and implementing programs that will affect their lives. In Sierra Leone, a joint project between Cooperative Programs and Social Sciences involves the participation of small-scale farmers in the identification of rural development problems and the sources of indigenous agroecological knowledge they use to solve these problems. A particularly innovative aspect of the project will be the use of a highly successful work-oriented Functional Adult Literacy Program (FALP) set up in some 50 villages by Canadian University Services Overseas (CUSO). FALP consists of classes held three times a week at which key words that come up during discussion of local problems serve as focal points for literacy instruction.

The Role of Women

Much progress is being made in recognizing the important role played by women in development. As our knowledge advances about their contribution, it is difficult to understand in retrospect why development specialists neglected the significance of a contribution that is now so apparent.

In most households, the woman is the first one up in the morning. She makes a fire to boil water for tea or coffee, milks the cow or the buffalo, and sends the daughter off to fetch water and wood from sometimes quite far away. In the Sudan, Nuba women cultivate the land from start to finish. In Java, they do most of the rice transplanting, weeding, and harvesting. It is women who make up much of the agricultural labour force in developing regions.

We now know much more about the important role women play in development.

In countries such as Zimbabwe, where years of war have dislocated many rural people, women are now returning to farming and they will continue to play a major role in subsistence agriculture and cash-crop production. However, conditions have changed dramatically, individual peasant plots having been largely abandoned in favour of communal farming. Women must have training to help them adapt.

"The best aid to give is intellectual aid, the gift of useful knowledge." (E.F. Schumacher)

IDRC has for some time acknowledged the importance of strengthening the capacity of women to analyze their own educational requirements. It has supported a network of women researchers in each of the major regions of the world to pull together their often very isolated experiences in adult education. In Zimbabwe, a project supported by the education program of the Social Sciences Division is reviewing the experiences of developing countries in Africa and elsewhere in the rural resettlement of women. The project will help in the planning of a comprehensive program of women's education for pilot implementation in one resettlement area.

Training for the Future

A long-term view of development encompasses facets often ignored when the concern is primarily with immediate results. The training of young scientists and scholars is a case in point. Setting up a solid foundation on which to build a research infrastructure that will allow a country to define its own objectives and policies is a form of long-range aid that cannot be readily assessed and quantified. But it may be the most important form of development assistance. This is why economist and thinker E.F. Schumacher often said: "The best aid to give is intellectual aid, the gift of useful knowledge."

The support provided by IDRC's Fellowships and Awards Division (FAD) aims at helping developing countries acquire human capital — researchers, managers, planners, and administrators. A project in Bhutan, supported by AFNS and mentioned earlier in this document, will seek to increase the country's rice production. A companion training project will help ensure that local scientists can sustain a long-term research effort to meet the country's needs.

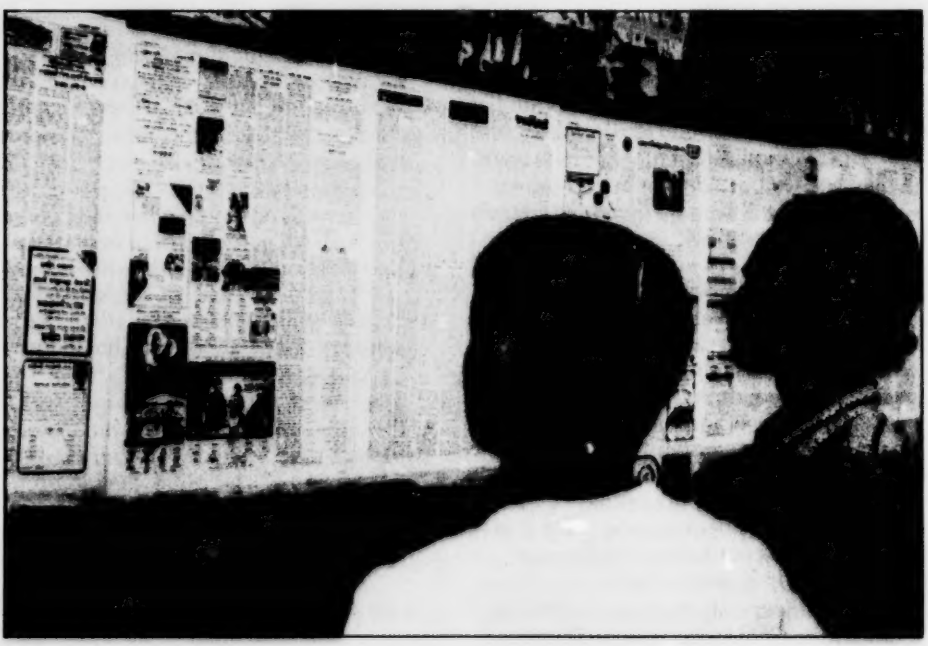
Another highly successful project, based at the National University of Singapore, has set up a course to train managers in forestry research and development and to build an institutional capacity within the region to provide such training on a continuing basis. Participants came from Bangladesh, Burma, China, Fiji, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, Papua New Guinea, Sri Lanka, and Thailand.

The politics of rural neglect make it hard for researchers operating outside of major urban centres to obtain the funding necessary for their work. An imaginative project by the Social Sciences Division will provide awards to provincial universities in Peru to enable rural-based researchers to undertake policy-relevant studies in the area of economics and rural development. An innovative component of the project is that awardees will be ensured contacts with senior social scientists and officials in Lima as they carry out their studies.

In the Age of Communication

Without effective communication, rural development is not complete. Rural dwellers have to break out of their isolation if they are to finally become part of the larger economic sphere. Print and other media have played a catalytic role in the building of modern societies and their importance will be just as great in countries whose development must rest on functional literacy. Media entertain, but they also inform. They can make it possible for policies to be discussed, for the web of knowledge to spread and include those who are neglected and alienated.

IDRC's Communications Division supports projects that will improve the



Media inform, make it possible for policies to be discussed.

ability of print and other media in developing countries to enhance public awareness and understanding of the role of science and technology in national development. In a joint effort with IDRC's Cooperative Programs Division, support from the Communications Division enabled the Canadian Broadcasting Corporation (CBC) and the Asia–Pacific Institute for Broadcasting Development (AIBD) to collaborate on an intensive 3-week training course for radio professionals in Asia and the South-Pacific. As a result, 16 people actively engaged in science radio programing, including a radio instructor from the Caribbean, were trained.

IDRC also assists national research centres to communicate research results. For example, one project helped Thailand's Department of Agricultural Extension, with assistance from Kasetsart University, to conduct a 5-week communications training course for extension officials on the use of communications media to support agricultural extension.

The education program of the Social Sciences Division also supports research on the use of mass media in reaching rural populations living in scattered and isolated settlements. The use of educational radio, for example, has been increasing in many countries of Latin America, especially Peru, Bolivia, and Ecuador. In Peru, where many peasants are illiterate and speak Quechua, radio programing in their native language is an important window on the world. Researchers in one project will look at ways to incorporate Quechua songs, a vital element of popular culture, to enhance the appeal of radio programs dealing with topics such as modern agricultural and health practices.

In another related project in Peru, a study by the Centro Peruano de Estudios Sociales (CEPES) will look at ways of improving educational radio programing aimed at rural populations. A previous IDRC-supported project conducted by CEPES looked at the evolution of radio programs in Peru and programing alternatives such as listener participation. Another project will now examine, specifically, the impact of peasant participation on such programing.

THE International Development Research Centre (IDRC) is a corporation created by the Parliament of Canada in 1970 to stimulate and support scientific and technical research by developing countries for their own benefit.

The fields of investigation to which IDRC gives its financial and professional support include: farming; food storage, processing, and distribution; forestry; fisheries; animal sciences; energy; tropical diseases; water supplies; maternal and child health; education; population studies; economics; communications; urban policies; science and technology policy; and information systems.

Although IDRC is funded entirely by the Canadian Parliament, to which it reports annually, its operations are guided by an international 21-member Board of Governors. Under the IDRC Act, the chairman, the vice-chairman, and nine other governors must be Canadian citizens; in practice, 6 of the remaining 10 governors are from developing countries.

The Centre's programs help developing countries to build the scientific competence of their institutions and their researchers so that these countries can work to solve their own problems. Opportunities are given to researchers to broaden their experience through further specialized study or on-the-job training.

IDRC emphasizes the role of the scientist in international development and encourages Third World countries to draw on the talent of their own scientific communities. Building a strong local base for future research is an important objective of most IDRC-supported work. Research projects are identified, designed, conducted, and managed by developing-country researchers in their own countries, to meet their own priorities.

IDRC helps to create and supports international research networks through which developing countries can learn from each other, share common experiences, and conduct similarly designed studies in areas of mutual concern. It also promotes cooperation between developing-country researchers and their counterparts in Canada.

Research Programs

Agriculture, Food and Nutrition Sciences — In this group of related sciences, emphasis is on farming systems, social forestry in arid and semi-arid lands, and aquaculture. Specific areas of support include: previously neglected food sources such as root crops, food legumes, and oilseeds; agroforestry (growing trees and crops together); multiple cropping systems; improvement of pasture lands; use of non-conventional feeds for animals; fish and shellfish farming; post-production systems for the protection, processing, and distribution of food crops, fruit, and fish; and the economics of small-scale farm production and marketing.

Health Sciences — The division's support is concentrated in five broad areas of applied research: water supply and sanitation; maternal and child health; tropical and infectious diseases; occupational and environmental health; and health services research.

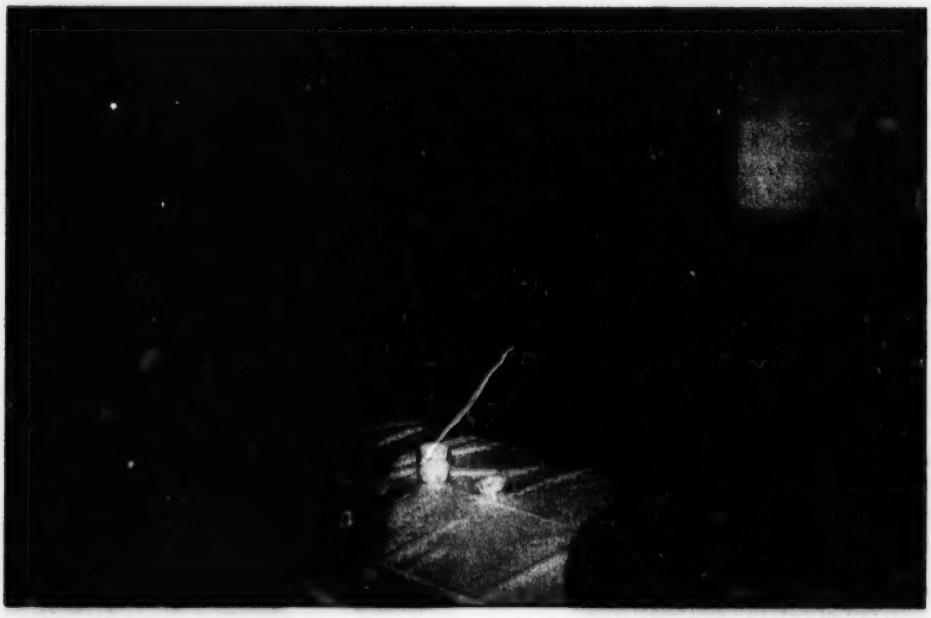
Social Sciences — Research supported by the division is designed to improve understanding of the social and economic issues related to international development, permitting researchers and policymakers to formulate policy options in several thematic areas. These include: education; population; science and

technology; energy; urban development; economics; and rural development. Support is also given to a limited number of national and regional institutions in the social sciences, and to research on problems of special regional concern.

Energy — The worldwide effects of unstable energy supplies and prices in recent years have underlined the urgent need for increased research on the energy problems of those most adversely affected — the developing countries. One of IDRC's major activities in this area has been the coordination of an international Energy Research Group comprised of 10 energy analysts and policymakers from developing countries. Funded jointly by IDRC and the United Nations University in Tokyo, the Group is working to identify energy research priorities for developing countries and to suggest how national, regional, and international research resources can be better allocated.

Information Programs

Information Sciences — Support given by the division helps developing countries to: establish regional and national information systems and improve library infrastructures at these levels; participate in international information networks; create specialized information centres (serving the region or world) on development-related subjects; strengthen sectoral information programs, especially in agriculture, health, population, industry, the environment, cartography, and social issues; and develop information tools and methods. The division's computer systems group provides internal ser-



An IDRC project-identification workshop in China.

vices and distributes MINISIS, a bibliographic software package designed by IDRC, to developing countries. In addition, a library and micrographics unit serve IDRC staff, the Canadian development community, and IDRC-supported projects.

Communications — Services provided by the division include: the publication and dissemination of the results of IDRC-supported research via print and film media; public affairs; and translation. The division also supports projects aimed at strengthening the ability of research institutions and communications media in developing countries to prepare and disseminate scientific and technological information.

Collaborative Programs

Cooperative Programs — The division promotes collaboration between scientific research groups in developing countries and their counterparts in Canada — whether academic, governmental, or private. By establishing channels of communication among scientists, the division helps improve the transfer of research results from Canada to the Third World. However, project support is open to all disciplines that contribute to Third World economic or social development and in which there is recognized Canadian expertise. It is important that the developing-country research group play a significant role in formulating a scientifically sound project proposal and in planning and executing the project, thereby strengthening its research capacity.

Fellowships and Awards — The division funds the training of junior and senior Third World scientists, managers, and planners working in sectors covered by IDRC's program divisions. Preference is given to individuals from the least developed countries and the emphasis is on professional upgrading rather than basic training. In addition, the division supports practical, non-degree group training to improve technical, research, and administrative skills of individuals. A portion of the division's funds is also used to encourage the involvement of young Canadian researchers in scientific areas of concern to IDRC, and to expose them to the problems of the developing world. These doctoral students are posted to a Third World country for studies, research, or placement.

Funding and Selection of Projects

Each program division channels funds to institutions in developing countries (government departments, universities, research centres, etc.), to international and regional institutions, and to Canadian institutions. The recipient is expected to pay a portion of the costs.

All projects are reviewed by IDRC's professional staff and assessed in light of factors such as:

- Development priority: Is the proposal consistent with national or regional development goals?
- Regional applicability: Are the research findings likely to be applicable in developing countries or regions other than the one in which the research takes place?
- Usefulness: Will the research help close gaps in living standards or lessen the imbalance in development between rural and urban areas?
- Local resources: Will the project make full use of local resources and research workers from the region?
- Training: Will the project result in better trained and more experienced researchers and more effective research institutions?
- Research area: Does the research fall within IDRC's areas of concentration?

When IDRC agrees to support a project, it enters into an agreement with the developing-country institution. In it are stipulated the project's purpose, research methods, payments, and a schedule for the research and progress reports.

Some of the members of IDRC's projects committee review proposals.

The Program Officer

Though IDRC itself rarely undertakes research, its program officers are highly-qualified professionals. One of their main functions is to respond to project ideas proposed by developing-country researchers and to evaluate the suitability of proposals in light of the criteria stated above.

Once a project has been approved in principle, the program officers collaborate with the institution submitting the proposal in further refining the project idea, provide administrative and technical advice, and help in preparing a project budget. Program officers are based either at IDRC headquarters in Ottawa or in one of the regional offices. In the regions, they help determine research priorities and prepare detailed annual plans of projects to be defined and developed, workshops and seminars to be organized, and maintain contact with research institutions throughout the region.

Project Approval

Before funds are appropriated, a project proposal must go through a formal approval process.

Authority to approve projects for which funding exceeds $100 000 (CAD) lies with IDRC's Board of Governors. It delegates approval authority to the President and the Vice-Presidents for projects up to $100 000, to Directors of individual divisions for projects up to $50 000, and to Deputy Directors for projects up to $15 000.

When a project has been approved, funds are appropriated by the Office of the Comptroller General and Treasurer. The Secretary's Office prepares a Memorandum of Grant Conditions (MGC) governing all aspects of the relationship between the signing parties. Once the MGC has been signed by the recipient, funds can be forwarded.

Books

IDRC annual report 1983–1984/Rapport annuel CRDI 1983–1984. 77 p. IDRC-003/84e,f

Coming full circle: farmers' participation in the development of technology. P. Matlon, R. Cantrell, D. King, and M. Benoit-Cattin. 176 p. IDRC-189e

Organización y conflicto: la educación primaria oficial en Colombia. H. Gómez-Buendía y R. Losada-Lora. 319 p. IDRC-199s

Pompes à main communautaires: recherche et évaluation en Asie. D. Sharp and M. Graham. 80 p. IDRC-204f. *(Also available in English IDRC-204e and Spanish IDRC-204s)*

Toxicidad de la yuca y tiroides: aspectos de investigación y salud. F. Delange y R. Ahluwalia. 152 p. IDRC-207s. *(Also available in English IDRC-207e)*

Le logement élémentaire: viabilisation et habitat dans les pays en développement. A.A. Laquian. 176 p. IDRC-208f. *(Also available in English IDRC-208e)*

Les contextes de recherche en éducation dans les pays en développement. S. Shaeffer et J.A. Nkinyangi. 290 p. IDRC-213f. *(Also available in English IDRC-213e)*

Crop improvement in Eastern Africa: research objectives and on-farm research; a regional workshop held in Nairobi, Kenya, 20–22 July 1983. R.A. Kirkby. 122 p. IDRC-218e

Social scientists in agricultural research: lessons from the Mantaro Valley Project, Peru. D.E. Horton. 67 p. IDRC-219e. *(Also available in French IDRC-219f and Spanish IDRC-219s)*

Searching: review of IDRC activities 1983. 40 p. IDRC-220e. *(Also available in French IDRC-220f and Spanish IDRC-220s)*

Tropical root crops: production and uses in Africa: proceedings of the second Triennial Symposium of the International Society for Tropical Root Crops — Africa Branch held in Douala, Cameroon, 14 - 19 August 1983. E.R. Terry, E.V. Doku, O.B. Arene, and N.M. Mahungu. 231 p. IDRC-221e

SALUS: low-cost rural health care and health manpower training : an annotated bibliography with special emphasis on developing countries. Volume 11. R.M. Bechtel. 134 p. IDRC-222e

Devindex 1983: index to selected literature on economic and social development/Index d'ouvrages sur le développement économique et social. 222 p. IDRC-223e,f

Estrategias para el uso de residuos de cosecha en la alimentación animal: memorias de una reunión de trabajo efectuada en el Centro Agronómico Tropical de Investigación y Enseñanza, Turrialba, Costa Rica, 19–21 Marzo 1980. M.E. Ruiz, A. Ruiz y D. Pezo. 159 p. IDRC-224s

SALUS: low-cost rural health care and health manpower training: an annotated bibliography with special emphasis on developing countries. Volume 12. R.M. Bechtel. 137 p. IDRC-225e

Infant mortality and health in Latin America: an annotated bibliography from the 1979–82 literature (includes Spanish, Portuguese, and French entries). M. Farren. 172 p. IDRC-226e

SALUS: low-cost rural health care and health manpower training: an annotated bibliography with special emphasis on developing countries. Volume 13. R.M. Bechtel. 140 p. IDRC-227e

SALUS: low-cost rural health care and health manpower training: an annotated bibliography with special emphasis on developing countries. Volume 14. R.M. Bechtel. 143 p. IDRC-228e

SALUS: low-cost rural health care and health manpower training: an annotated bibliography with special emphasis on developing countries. Volume 15. R.M. Bechtel. 145 p. IDRC-230e

Rural university: learning about education and development. F. Arbab. 71 p. IDRC-231e

Proyectos de viviendas urbanas de bajo costo: bibliografía anotada de investigaciones apoyadas por el CIID y el BIRF. 64 p. IDRC-TS41s

Systèmes internationaux d'information socio-économique: étude d'évaluation des programmes de type DEVSIS. W.O. Aiyepeku. 103 p. IDRC-TS43f. *(Also available in English IDRC-TS43e)*

Comunicación entre grupos: el método del cassette-foro. M. Kaplún. 111 p. IDRC-TS45s

Educational research: the English-speaking Caribbean. E.L. Miller. 199 p. IDRC-TS46e

Rearing of marine fish larvae in Japan. K. Kuronuma and K. Fukusho. 111 p. IDRC-TS47e

Improving small-scale food industries in developing countries. W. Edwardson and C.W. MacCormac. 167 p. IDRC-TS48e

Tropical timber for building materials in the Andean Group countries of South America. F.J. Keenan and M. Tejada. 151 p. IDRC-TS49e

Management of information centres in China: results of a course held in Kunming, Yunnan Province, People's Republic of China, 6–18 December 1982. K.P. Broadbent. 470 p. IDRC-TS50e

Magazine

The IDRC Reports/Le CRDI Explore/El CIID Informa

This is a quarterly magazine of report and comment on the work supported by IDRC and on related activities in the field of international development. It is published in three separate language editions. Total circulation of the English, French, and Spanish editions is 23 000 per issue, of which 50 percent is to the developing countries, 25 percent within Canada, and the remainder to other countries.

Films

Footholds

For 300 years, the peasant farmers of Latin America have lived in poverty. They lack land, tools, and other necessary resources. Large-scale modernization schemes and so-called appropriate technologies have been of little benefit in their lives. "Footholds" documents how some Latin American research groups are discovering and understanding the interrelated and complex processes that explain the predicament of the peasants. These groups are designing and implementing education models, such as a rural university in Colombia, and showing how both new and old agricultural methods, such as those of the ancient Incas, can be revitalized to improve the peasant's well-being. The 29-minute, 16-millimetre colour film, shot on location throughout Latin America, was produced by IDRC's Communications Division.

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